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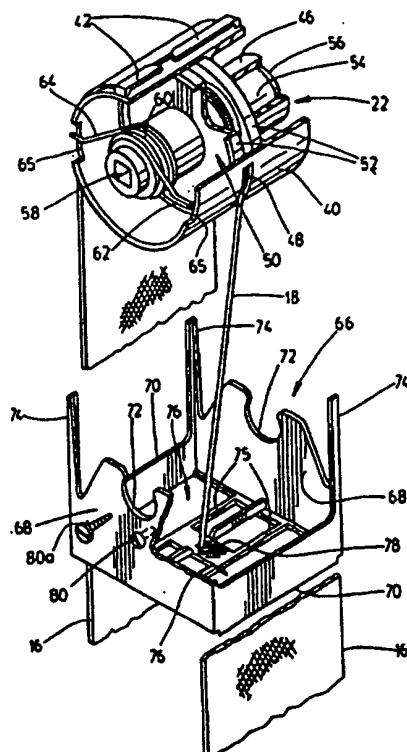
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#### 4.4.1.4.1. COMBINED TILT AND RAISE CONTROL FOR WINDOW COVERINGS

### (57) Abstract

A combined tilt and raise control (22), for use with a window covering (10) having slats (14) suspended by ladder tapes (16) connected to the slats, and slat raise elements (18) for raising and lowering the slats and a tilt and raise control rod (24) for operating the combined tilt and raise control, the tilt and raise control having a drum (40) for securing and operating the ladder tapes and defining a hollow interior, a raise element opening (48) in the drum bearings, a raise control reel (50) rotatably mounted in the drum, a two-way rotation control (60) connecting between the raise control reel and the drum so that operation of the tilt and raise control rod between predetermined limits will be transmitted to the drum to cause movement of the ladder tapes and tilting of the slats, and so that movement of the tilt and raise control rod beyond such limits, will release the raise control reel from the drum and cause operation of the reel independently of the drum.



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COMBINED TILT AND RAISE CONTROL FOR WINDOW COVERINGSTECHNICAL FIELD

The invention relates to a combined and tilt and raise control for window coverings.

5 BACKGROUND ART

Window coverings such as blinds and shutters for windows, and doors, usually have horizontal slats suspended horizontally relation from a head rail. Ladder tapes are suspended from the head rail and are connected to each slat. Raise cords raise the slats upwardly, In addition, a tilt control is connected to the ladder tapes to tilt all of the slats one way or the other between open and closed position. Such window coverings require two separate controls, a tilt control for operating the tilting of the ladder tapes, and a raise control for operating the raise cords.

10 It is desirable to provide a combined tilt and raise control for operating both tilt and raise functions from a single set of controls.

20 DISCLOSURE OF THE INVENTIONS

With a view to providing a combined tilt and raise control for window coverings the invention comprises a control for use with window coverings having a head rail, slats suspended from said head rail by ladder tapes extending from said head rail and connected to said slats, and slat raise elements extending from said head rail for raising and lowering said slats, and a tilt and raise control rod in said head rail for operating said combined tilt and raise controls, and means for operating said tilt and raise control rod, said tilt and raise control comprising, drum means for securing and operating said ladder tapes and defining a hollow interior, a raise element opening defined by said drum means, raise control bearing means within said drum means, a raise control reel means rotatably mounted in said bearing means within said drum means, two way rotation control means connecting between said raise element reel means and said drum means,

5 whereby operation of said tilt and raise control rod between predetermined limits will be transmitted to said drum means to cause movement of said ladder tapes and tilting of said slats, and will release said raise control reel means from said drum means and cause operation of said reel means independently of said drum means.

10 A further feature of the invention is a provision of rotation control means incorporating spring means, mounted on said raise control reel means, and having spring arm portions interengagable with said drum means, and abutment means to cause said spring arm portions to turn said drum means in one mode, and releasing said raise control means in another mode, to turn independently of said drum means.

15 A further feature of the invention provides a mounting bearing means for rotatably supporting said drum means and said raise control reel means, and retention means for retaining the same in said head rail.

20 The various features of novelty which characterize the invention are pointed out with more particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

25 BRIEF DESCRIPTION OF THE DRAWINGS

30 Figure 1 is a perspective partially cut away illustration of typical window coverings, incorporating a combined tilt and raise control illustrating the invention;

Figure 2 is a perspective illustration, in isolation, showing the combined and tilt and raise pulley drive for rotating the tilt and raise rod;

35 Figure 3 is an enlarged exploded perspective view of one of the tilt and raise controls of the window coverings of Figure 1;

Figure 4 is a exploded sectional view of the tilt and raise control of Figure 3;

Figure 5 is a schematic end view showing one mode of operation of the tilt and raise control;

Figure 6 is schematic end view corresponding to Figure 5 showing another mode of operation;

5 Figure 7 is a schematic end view showing a third mode of operation;

Figure 8 is a schematic perspective illustration, exploded and illustrating an alternate embodiment of the raise control of Figures 3 and 4;

10 Figure 9 is an exploded perspective illustration of an alternate form of tilt and raise control, illustrating two spring means, and a split tape drum;

Figure 10 is a section along the line 10 - 10 of Figure 9;

15 Figure 11 is a schematic illustration illustrating one mode of operation of the embodiment of Figures 9 and 10;

Figure 12 is a view corresponding to Figure 11 showing an alternate mode of operation, and,

20 Figure 13 is an exploded perspective view of an alternate embodiment.

#### MODES OF CARRYING OUT THE INVENTION

In Figure 1, a window covering such as slatted blind is indicated generally as 10. Window covering 10 has a head rail 12 of U-shape. Slats 14 are located spaced below the head rail 12. Usually an oversize lower end slat or bottom rail 14a is provided. The slats 14 are supported on ladder tapes 16, and extend underneath the slats, and support them.

30 Operation of the ladder tapes will tilt the slats one way or the other to open and close the window coverings.

Raise elements 18 are connected to the bottom rail 14a, and extend freely through openings 20 in the slats 14. Operation of the raise elements causes the slats to be raised upwardly, or lowered downwardly.

35 Within the head rail 12 there are provided two or more combined tilt and raise controls 22-22 depending on the numbers of ladder tapes and raise elements. They are

connected to a tilt and raise control rod 24, shaped to transmit a rotational drive.

5 The ladder tapes 16 are connected to the tilt and raise control elements 22-22, and the raise elements 18 are also connected to portions of the tilt and raise controls 22-22. The rod 24 extends into a rotary drive coupling 26. The drive 26 is shown as operated manually by means of a pulley 28, and an endless operating cord 30 extending around pulley 28.

10 In Figures 3 and 4, the tilt and raise control will be seen to have a large diameter drum body 40, of cylindrical shape, and is open at both ends. Ladder tape retainers 42 are provided on the exterior of the body 40, for engaging the ends of the ladder tapes 16.

15 Within the drum 40 there is a circular inner mounting wall 44 (Figure 4), and an inner cylindrical bearing sleeve 46 is mounted on the wall 44.

20 A partly annular slot 48 extends through drum 40, for receiving a raise element 18.

25 Within drum 40, there is provided a rotatable raise element reel 50. Reel 50 comprises a pair of reel cheeks 52-52, integrally formed with a central reel mounting body 54. Body 54 has reduced diameter end bearings 56 at each end, and has a through opening 58 shaped to receive the rod 24 in driving engagement. The body 54 is of cylindrical shape and is rotatably received in bearing sleeve 46.

30 The reel cheeks 52 define a spacing which registers with the slot 48.

35 In order to transmit rotational movement from the body 54 to drum 40 a two way rotation control is provided, which in this case is a helical spring 60 having outwardly extending end arms 62 and 64. The spring 60 is wound so as to make a snug frictional driving fit on the exterior of body 54.

30 Outward flexing of either of the arms 62 or 64 will however slightly expand the spring 60 thereby releasing it from the body 54.

There could be two or more such springs, of wire, or resilient plastic material.

5 In order to transmit drive from the arms 62 and 64 to the drum 40, the drum 40, notches 65, receive the respective arms. Notches 65 allow for some free movement of the arms 62, 64.

10 The drum 40, and reel 50 are together rotatably received in a bearing mounting 66 (Figure 3). Bearing mounting 66 has two bearing end walls 68 connected by side walls 70. End walls 68 define bearing recesses 72. Four retention fingers 74 extend upwardly from the end walls 68, to frictionally retain the bearing mounting 66 in the head rail 12.

15 A pair of spacer rails 75 extend between end walls 68, and define together with side walls 70, elongated open spacings 76 for passage of the ladder tapes 16.

Guide ribs 78 extend between rails 76 and define a guide recess for receiving raise element 18.

20 The head rail 12 has an opening (not shown) registering with end walls 68 and side walls 70, so as to permit the ladder tapes 16, and raise element 18 to pass freely down.

25 The raise element 18 passes through the annular slot 48 and is wound up on the reel 50, between the two cheeks 52. The raise element 18 is a narrow flat filament or tape, so that it will wind and unwind easily.

30 A screw 80, is secured on end wall 68, and extends into the end of drum 40, to engage with one or other of arms 62, 64, when the slats are fully rotated one way or the other. A second stop member 80a could be used where the blind has narrower (i.e. one inch) slats, to reduce the arc of rotation from stop to stop.

35 In operation, when the body 54 of the reel 50 is rotated to the left (Figure 5) and rotate the slats closed (one way or the other). Arm 64 will then engage stop 80. Further rotation of body 54 will cause the arm 64 to flex the spring open, relaxing the grip of the spring on the

body 54 and allow the body 54 to rotate, without causing rotation of the drum 40. Reel 50 will wind up the raise element 18.

5 In the opposite mode of operation when the body 54 is rotated to the right (Figure 6) the slats will tilt the other way and the arm 62 will engage stop 80. This will again cause the arm 62 to flex the spring, opening the spring 60 and releasing the body 54 so that it can rotate and unwind the raise element 18.

10 Between these two positions (Figure 7) when the body 54 is partially rotated, then neither arm 64 nor arm 62 will contact the stop 80. In this position, the spring 60 will bind on the body 54, and the arms 62 and 64 will engage the drum 40, causing the drum 40 to partially rotate. This will then cause tilting, one way, or the 15 other, of the slats.

15 A further embodiment of the invention is illustrated in Figure 8.

20 In this illustration, a modified form of drum 40a is formed with pairs of spaced apart interior ribs 80 and 82, mutually opposed across a diameter of the drum.

25 A modified form of reel 50a is provided. In this modification, the cheeks 52a are formed with pairs of notches 84 and 86 spaced apart from one another on either side of the reel. The notches 84, 86 register with the ribs 80, 82.

30 The arms 62a, 64a, of the spring 60a are slightly shorter than in the embodiment of Figures 2 through 7, and fit within the drum 40a, and remain captive between respective pairs of ribs 80 and 82, but, moveable around the arc confined by the ribs.

35 A further embodiment of the invention is illustrated in Figures 9, 10, 11, and 12.

35 A reel 100 has cheeks 102, for winding up a raise element. It is mounted on a central body 104 having a drive opening 106, to receive a tilt and control rod (not shown).

A drum assembly has two semi-cylindrical drum portions 108 and 110. The drum portions extend around arcs of somewhat less than 180°. Each drum portion is provided with a generally semi-annular slot 112, for receiving the raise element. In addition, cord retention holes 114 are provided.

5 Each of the drum portions has a pair of spaced apart notches 116, halfway around the arc of each drum portion and at opposite ends thereof.

10 Rotation drive control means are provided by means of the two thermoplastic spring assemblies 120 and 122. The spring 120 is a cylindrical barrel shape helical spring portion 124 having helical notch 125, and having end arms 126 and 128 connected to the opposite ends of the helical spring portion. Each of the arms 126 and 128 has a drum holding bracket 130 at its end, shaped to interfit with the notches 116.

15 The spring assembly 122 is a cylindrical helical spring 132, having a by a helical slot 134. End arms 136 and 138 extend from opposite ends of the helical spring. At the free ends of the arms 136, 138, there are located drum connector brackets 140, shaped to interfit with the notches 116 in the drum portions.

20 The entire assembly (Figure 10) is arranged to be supported in a bearing mounting bracket 150, having end walls 152, and stop screws 154 in opposite end walls. The stop screws 154 engage the arms 126, 128, and 136, 138, respectively of the respective drive connectors 120 and 122.

25 The body 104 of the reel 100 passes through the helical cylindrical spring 124, 132, and by their inherent bias, the springs will provide a gripping frictional drive on the body 104.

30 The two drums portions are held between the connectors 130 and 140 on the arms, with gaps between the edges of the drum portions (Figures 10, 11, and 12). As the body 104 is rotated one way, the arms of the respective drive

assemblies 120, 122, will abut against the screws 154, either on one side or on the other side (Figures 11, and 12). Such abutting will cause the helical spring portions 124, 132 to be flexed open thereby releasing the body 104, so that the reel can be rotated, while the drum portions remain stationary.

Between the two extreme positions, the helical spring portions 124, 132 will grip the body 104. Rotation of the body 104 between the two extreme portions will thus cause rotation of the drum portion, and cause tilting of the ladder tapes.

Stop screws 154 as shown allow for substantially 320° of rotation, from stop to stop. This may be desirable with wider slats. With narrower slats two pairs of such stop screws 154 could be used to reduce the arc of rotation from stop to stop.

A further embodiment is illustrated in Figure 13. A reel 200 has a cylindrical reel body 202, with bearings 204 at each end. Cheeks 206 define a tape receiving enclosure as before. A central drive sleeve 208 is formed integrally, to receive a drive rod 210. A spring 212 fits around body 202 and has inturned ends 214 and 216.

A tape drum 218 is formed having partition 220 supporting a sleeve 222. Sleeve 222 rotatably receives body 202. A protruding channel 224 is formed integrally with drum 218, and extends axially therealong. Tape receiving rods 226 are formed on either side of channel 224, and the ladder tapes are fastened around the rods 226. A removable end member 228 fits over the free ends of rods 226 to retain the tapes in position.

A drum support 230 is provided having end members 232 defining bearing recesses 234 for reception of bearings 204 of body 202. Drum support 230 is provided with a pair of wire stop arms 236 and 238, which are in fact formed of a single integral piece of wire captively retained beneath drum support 230.

When assembled the arms 214 and 216 of spring 212 are received in channel 224 of drum 218. When the body and drum are rotated to the left the arm 216 will engage stop 236. Further rotation will cause spring to relax slightly, 5 thus allowing the body 202, and cheeks 206 to continue to rotate, while the drum is held stationary.

When the body and drum are rotated to the right arm 214 will engage stop 234. Again this will relax the spring and allow the body to rotate while holding the drum. 10 Between these two positions the slats will only slightly tilted or will be horizontal.

The foregoing is a description of a preferred embodiment of the invention which is given here by way of example only. The invention is not to be taken as limited 15 to any of the specific features as described, but comprehends all such variations thereof as come within the scope of the appended claims.

CLAIMS

1. A combined tilt and raise control (22), for use with a window covering having a head rail (12), slats (14) suspended from said head rail by ladder tapes (16) extending from said head rail and connected to said slats, and slat raise elements (18) extending from said head rail for raising and lowering said slats, and a tilt and raise control rod (24) in said head rail for operating said combined tilt and raise control and means (30) for operating said tilt and raise control rod, said tilt and raise control comprising;  
drum means (40) for securing and operating said ladder tapes and defining a hollow interior;  
a raise element opening (48) defined by said drum means;  
a raise control reel means (50) rotatably mounted in bearing means within said drum means;  
two way rotation control means (60) connecting between said raise element reel means and said drum means, whereby operation of said tilt and raise control rod between predetermined limits will be transmitted to said drum means to cause movement of said ladder tapes and tilting of said slats, and wherein movement of said tilt and raise control rod beyond said limits, will release said raise control reel means from said drum means and cause operation of said reel means independently of said drum means.
2. A combined tilt and raise control as claimed in Claim 1 and including a helical spring (60), mounted on said raise control reel means, and having arm portions (62, 64) interengagable with said drum means, and abutment means (65) interengagable with said arm means, whereby to cause said spring arms to turn said drum means in one mode, and stop means (80) operable in another mode to release said raise control means for rotation, independently of said drum means.

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3. A combined tilt and raise control as claimed in Claim 1 and including mounting bearing means (66) for rotatably supporting said drum means and said raise control reel means, and retention means (74) for retaining same in said head rail.

4. A combined tilt and raise control as claimed in Claim 1 and including a drum means consisting of an essentially cylindrical drum member (40), an annular slot (48) extending partially around said drum member and extending therethrough, between its ends, and ladder tape retention means (42) on the exterior of said drum means.

5. A combined tilt and raise control as claimed in Claim 3 and including a guide (78) in said mounting bearing means, through which said raise element may be passed, into engagement with said raise control reel means.

6. A combined tilt and raise control as claimed in Claim 1 and including a raise control reel means (50) consisting of a elongated body member (54), bearing means (56) at each end of said body member, and a pair of reel cheeks (52), formed integrally with said body member and extending radially outwardly therefrom, and defining a generally annular shape, having a diameter greater than the cross-section of said body member, and being spaced apart to receive said raise element.

7. A combined tilt and raise control as claimed in Claim 1 and including spring arm retention ribs (80,82) formed on the inside surfaces of said drum (40a), adapted to engage ends of said spring arms (62a,64a).

8. A combined tilt and raise control as claimed in Claim 1 wherein said drum comprises two drum portions (108,110) of generally semi-cylindrical shape, and engagement means (116) at opposite ends of said drum portions.

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9. A combined tilt and raise control as claimed in Claim 8 and wherein said rotation control means comprise two spring assemblies (120,122), adapted to be positioned at opposite ends of said drum means, and arm portions (130,140) extending from said spring assemblies, for interengagement with said engagement means of said drum portions.

10 10. A combined tilt and raise control as claimed in Claim 8 wherein said spring assemblies are each formed of thermoplastic material, each having a helical slot (125,134).

15 11. A combined tilt and raise control as claimed in claim 1, and wherein said drum means (218) incorporates channel means (224) for receiving opposite ends of said spring (212).

20 12. A combined tilt and raise control as claimed in claim 11 and including a pair of stop arms (236,238) attached to said drum support (230) and engageable by respective ends of said spring when said drum is rotated.

25 13. A window covering (10) having a head rail (12), slats (14) suspended from said head rail by ladder tapes (16) and ladder tapes extending from said head rail and connected to said slats and slat raise elements (18) extending from said head rail for raising and lowering said slats and comprising;

30 a tilt and raise control rod (24) in said head rail for operating said ladder tapes, and said raise elements; combined tilt and raise controls (22) having, drum means (40) for securing and operating said ladder tapes and raise element opening means (48) defined by said drum means; raise control bearing means (46) within said drum means;

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raise control reel means (50) rotatably mounted in said bearing means within said drum means; two way rotation control means (60) connecting between said raise control reel means and said drum means, whereby operation of said tilt and raise control rod between 5 predetermined limits will be transmitted to said drum means to cause movement of said ladder tapes and tilting of said slats, and wherein movement of said tilt and raise control rod beyond said limits, will release said raise control 10 reel means from said drum means and cause operation of said reel means independently of said drum means.

14. A window covering as claimed in Claim 13 and including at least one helical spring (60), mounted on said raise control reel means, and having arm portions (62, 64) 15 interengagable with said drum means, and abutment means (65) interengagable with said arm means, whereby to cause said spring arms to turn said drum means in one mode, and stop means (80) interengageable in another mode to release said raise control means independently of said drum means. 20

15. A window covering as claimed in Claim 13 and including mounting bearing means (70) for rotatably supporting said drum means and said raise control reel means, and retention means (74) for retaining same in said head rail. 25

16. A window covering as claimed in Claim 13 and including a drum means (40) consisting of an essentially cylindrical drum member, and an annular slot (48) extending partially around said drum member and extending therethrough, between 30 its end, and ladder tape retention means (42) on the exterior of said drum means.

17. A window covering as claimed in Claim 13 and including 35 a guide (78) in said mounting bearing means, through which said raise element may be passed, into engagement with said raise control reel means.

18. A window covering as claimed in Claim 13 and including a raise control reel means consisting of a elongated body member (54), bearing means (56) at each end of said body member, and a pair reel cheeks (56), formed integrally with said body member and extending radially outwardly therefrom, and defining a generally annular shape, having a diameter greater than the cross-section of said body member, and being spaced apart to receive said raise element.

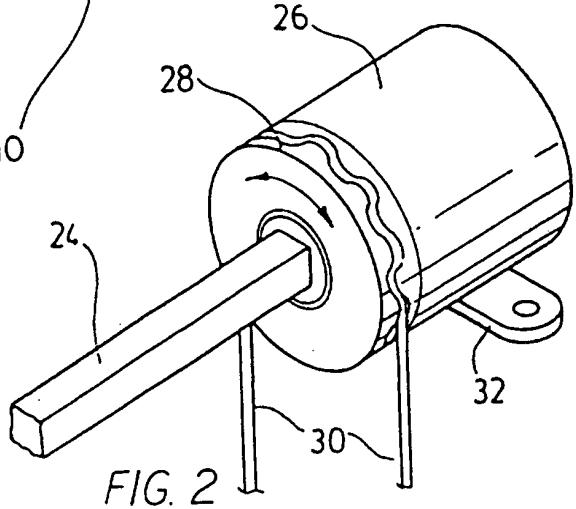
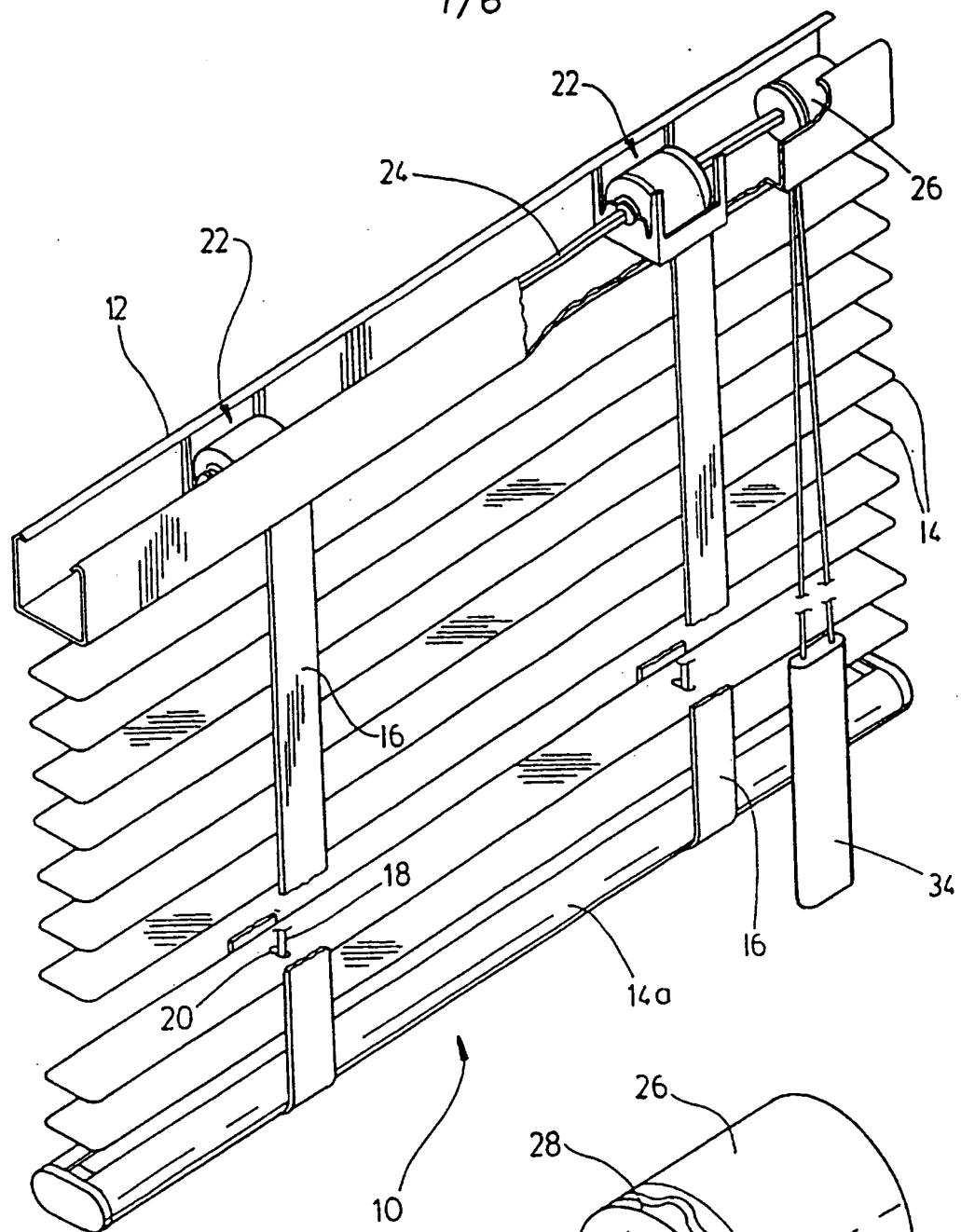
19. A window covering as claimed in Claim 13 and including spring arm retention ribs (80,82) formed on the inside surfaces of said drum, adapted to engage ends of said spring arms.

20. A window covering as claimed in Claim 13 wherein said drum comprises two drum portions (108,110) of generally semi-cylindrical shape, and engagement means (116) at opposite ends of said drum portions.

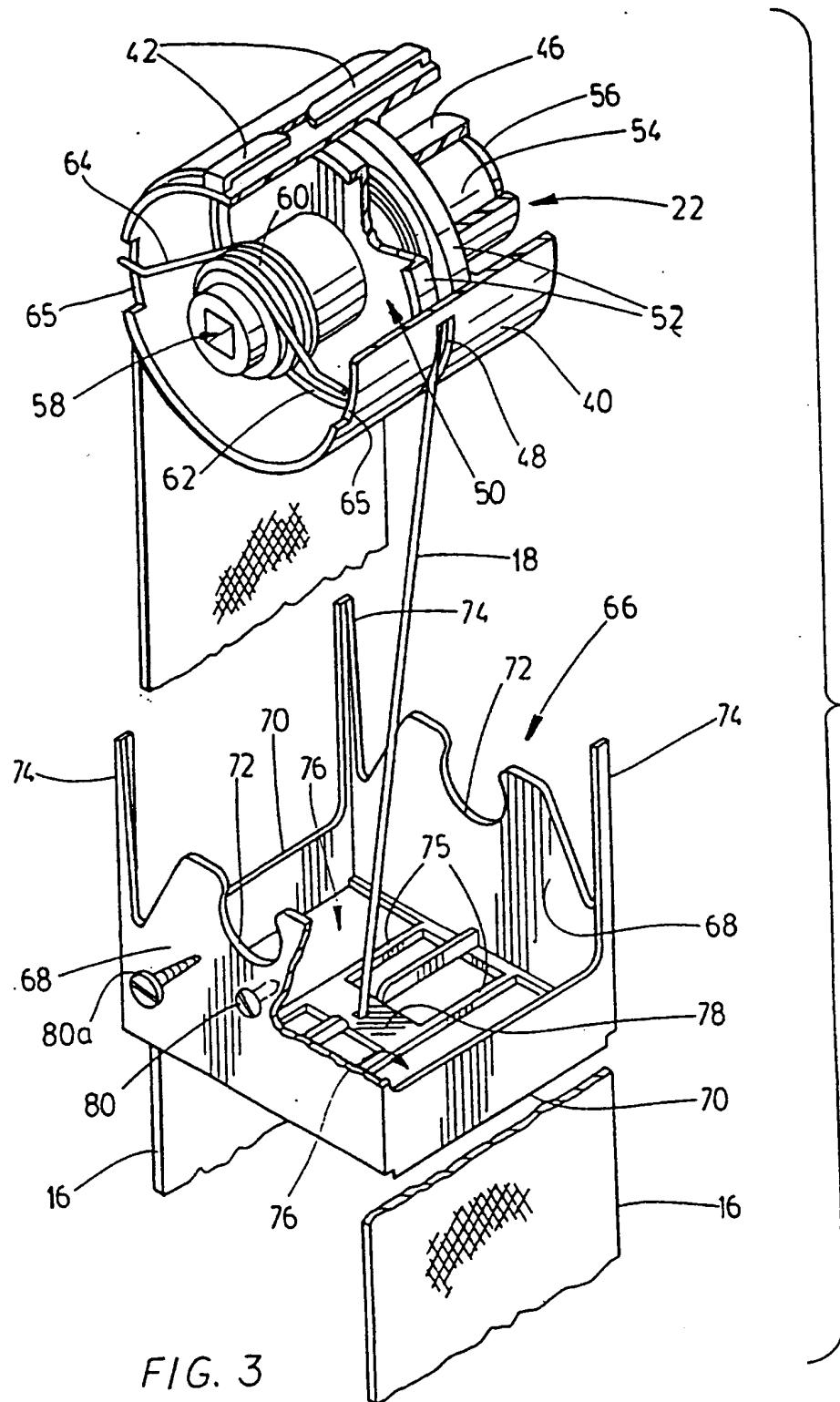
21. A window covering as claimed in Claim 13 and wherein said rotation control means comprise two spring assemblies (120,122), adapted to be positioned at opposite ends of said drum means, and arm portions (130,140) extending from said spring assemblies, for interengagement with said engagement means of said drum portions.

22. A window covering as claimed in Claim 13 and wherein said spring assemblies are each formed of thermoplastic material, each having a helical slot (125,134) therein.

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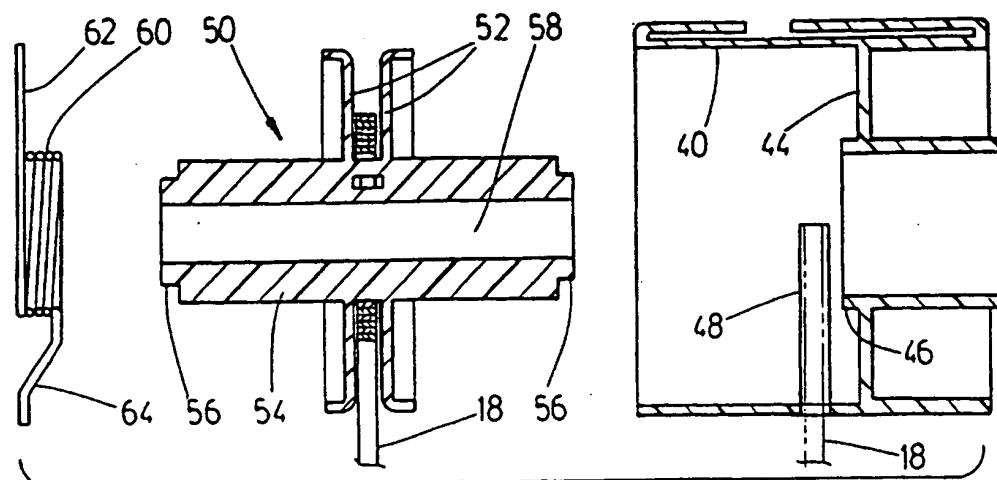


FIG. 4

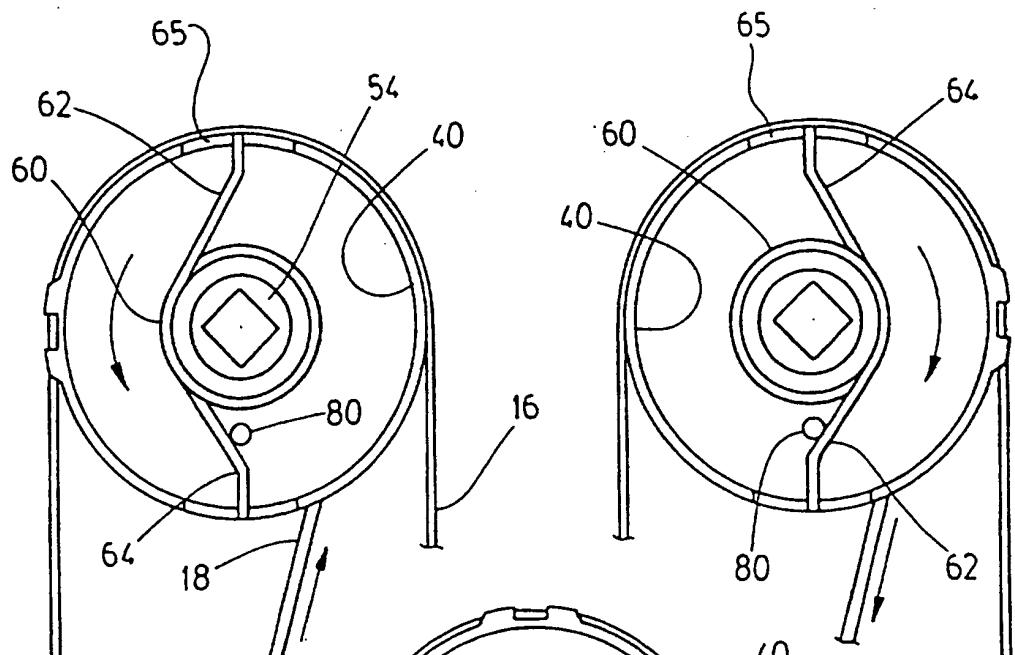


FIG. 5

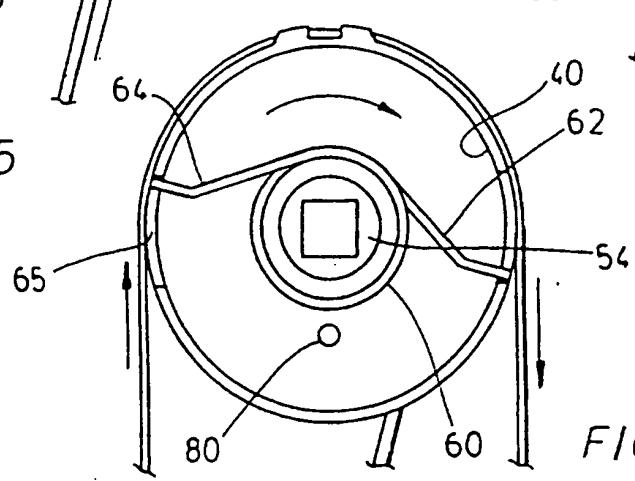
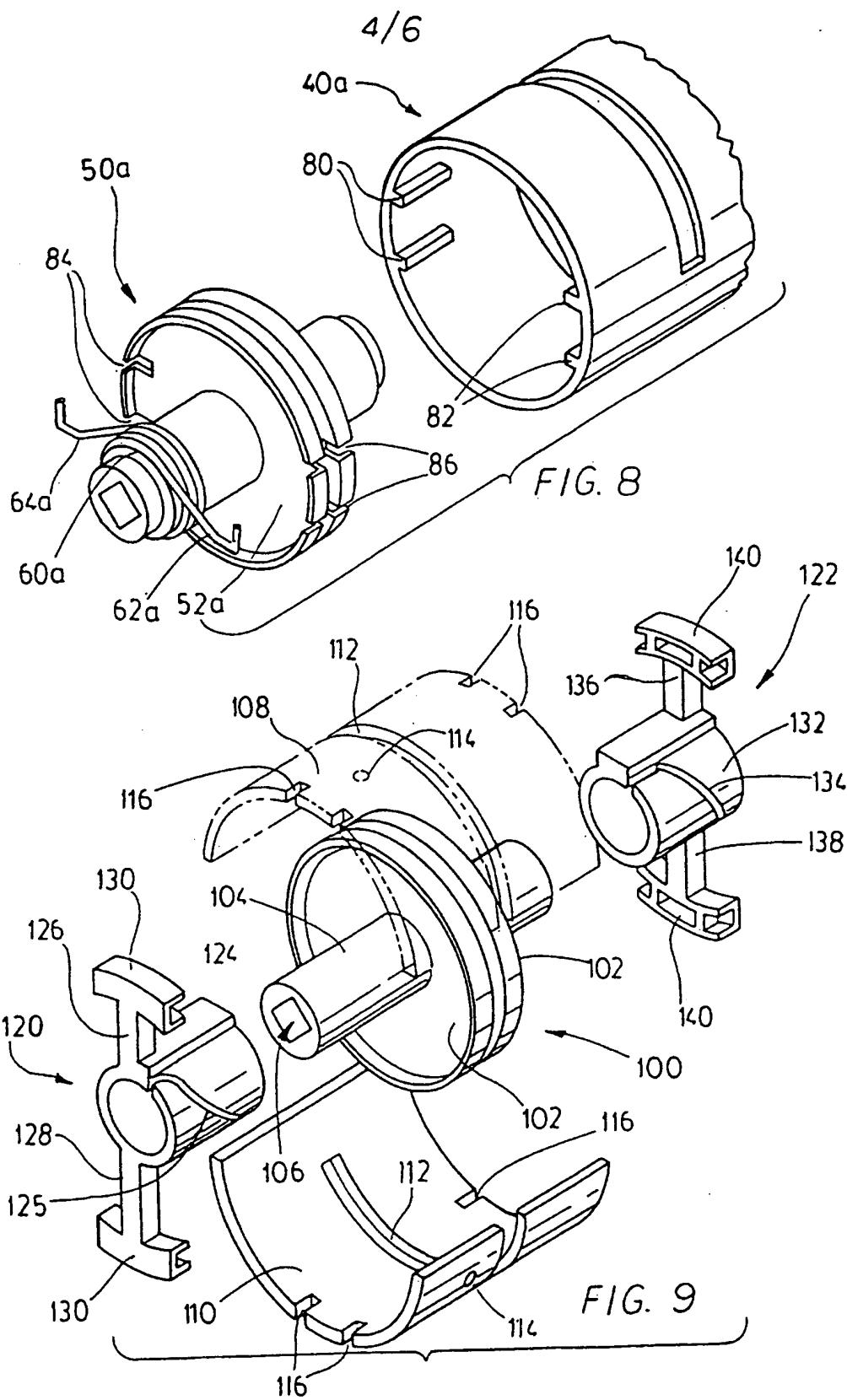
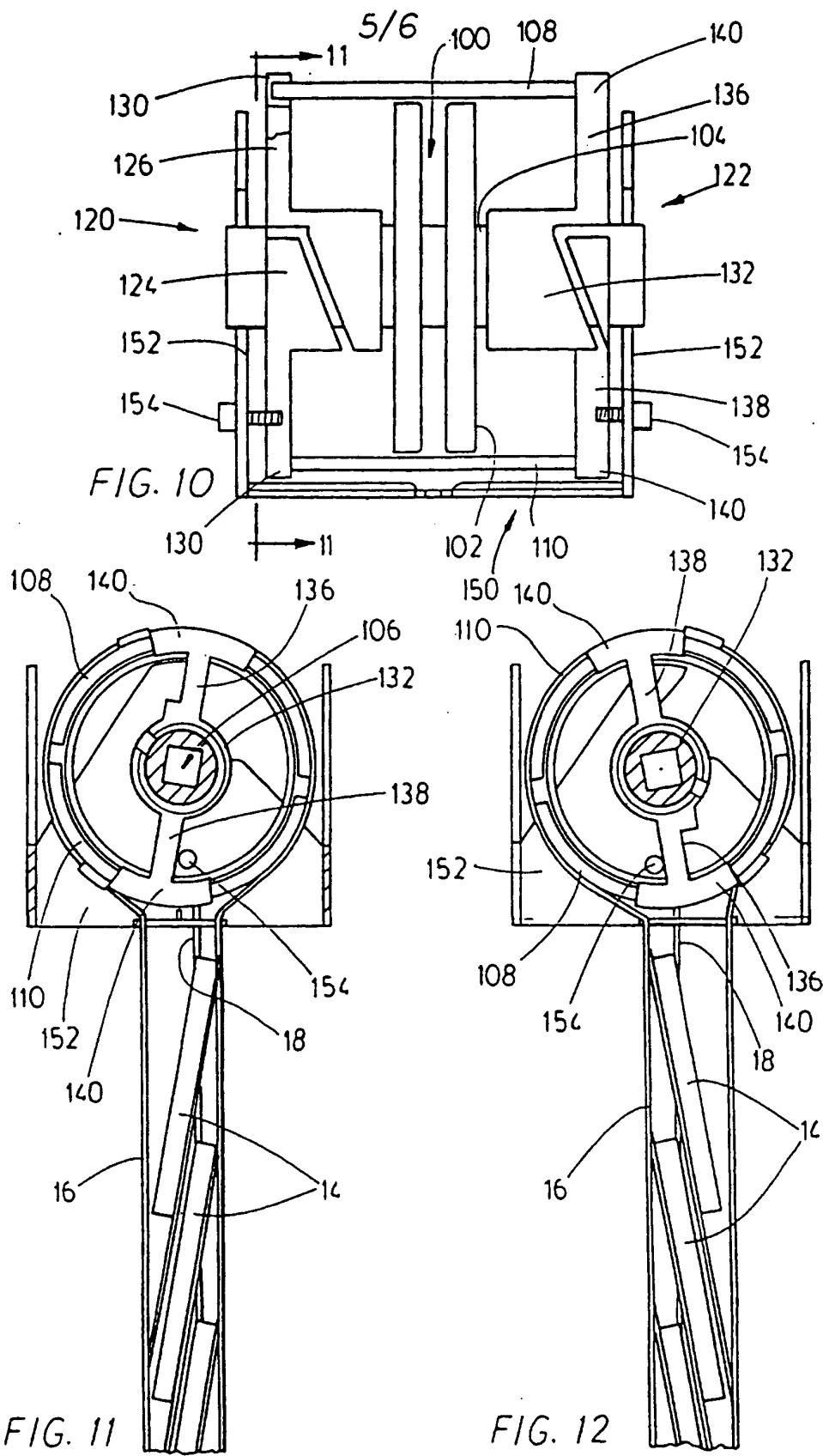


FIG. 6





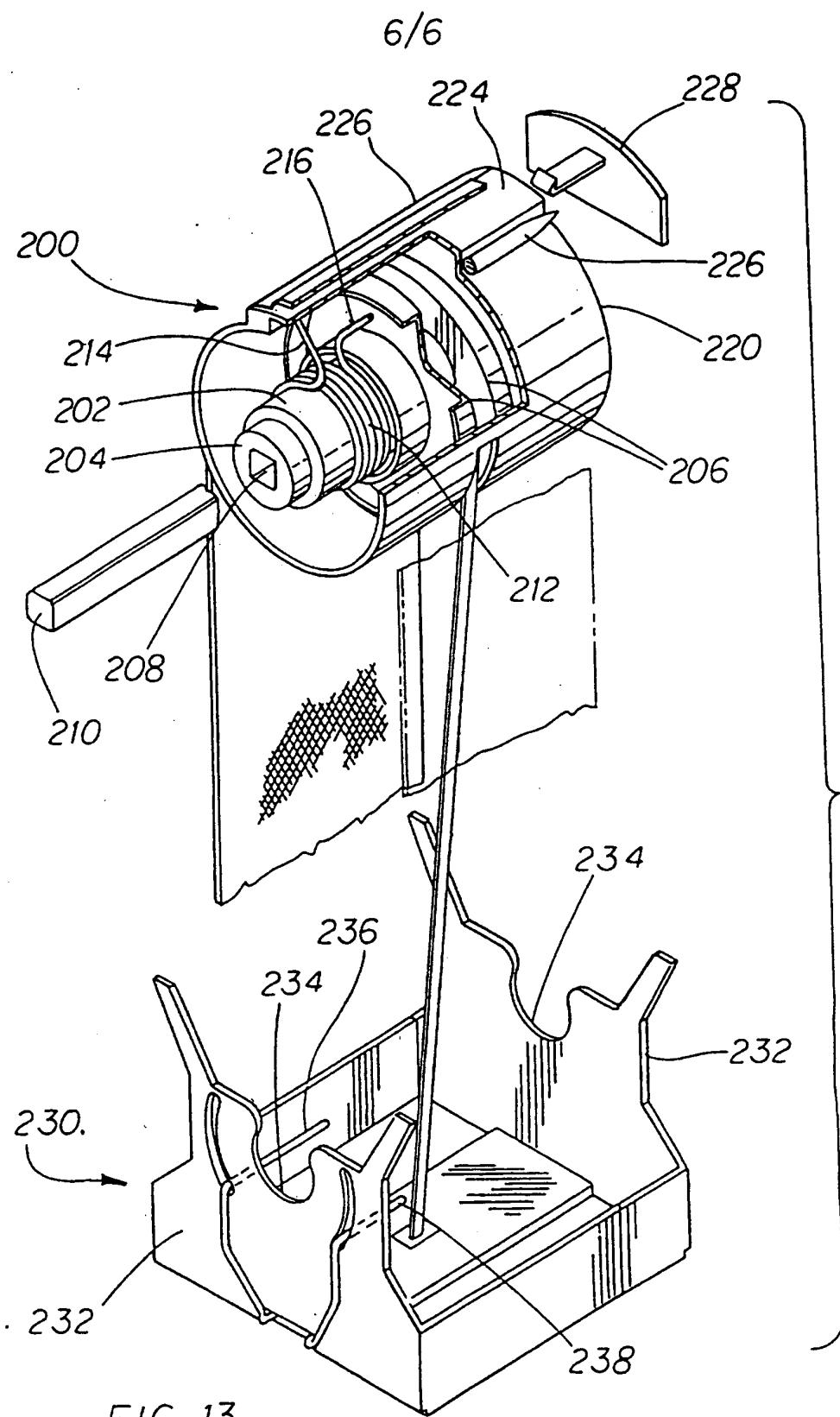


FIG. 13

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/CA 96/00132

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 E06B9/308

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 E06B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CH,A,400 817 (GRIESSE) 30 April 1966 see page 2, line 63 - page 3, line 38; figures 3-5	1-7, 13-19
A	---	8,11, 20-22
A	EP,A,0 190 626 (HUNTER DOUGLAS IND BV) 13 August 1986 see abstract; figure 1	1,13
A	--- US,A,4 200 135 (HENNEQUIN PETRUS J) 29 April 1980 see abstract; figures 2,3 -----	1,13

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

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**INTERNATIONAL SEARCH REPORT**

(Information on patent family members)

International Application No  
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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
CH-A-400817		NONE		
EP-A-0190626	13-08-86	DE-U-	8503040	20-06-85
US-A-4200135	29-04-80	DE-A- AT-B- AU-B- AU-B- BE-A- CA-A- CH-A- DE-C- FR-A, B GB-A- JP-A- NL-A-	2726452 376764 515464 3688478 868011 1089756 631515 2760255 2393920 1599608 54039939 7805860	23-05-79 27-12-84 02-04-81 13-12-79 11-12-78 18-11-80 13-08-82 26-02-87 05-01-79 07-10-81 28-03-79 13-12-78

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